APPENDIX B

STATEMENT OF WORK

FOR

THE REMEDIAL DESIGN/REMEDIAL ACTION
CONSENT DECREE

AT THE
COLORADO AVENUE SUBSITE
HASTINGS GROUND WATER CONTAMINATION SITE
HASTINGS, NEBRASKA

November 2, 2005

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STATEMENT OF WORK
FOR THE
CONSENT DECREE
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I. PURPOSE AND BACKGROUND INFORMATION

A. Purpose

The purpose of this Statement of Work ("SOW") is to set forth requirements for implementation of Work required by the Consent Decree. The Work includes Remedial Design ("RD"), Remedial Action ("RA"), Operation and Maintenance ("O&M") and Monitoring for the remedies selected in the two Records of Decision ("RODs") for the Colorado Avenue Subsite ("Subsite"), attached to the Consent Decree as Appendix A.

The ROD for Operable Unit 9 ("OU 9 ROD") was signed on September 28, 1988. The ROD for Operable Unit 1 ("OU 1 ROD") was signed on September 30, 1991 and amended on May 25, 1998.

This SOW is incorporated into and made a part of the Consent Decree entered into by the Settling Defendants and the United States. The Settling Defendants shall follow the RODs, the Consent Decree, the final approved RD/RA Work Plans and pertinent reference documents listed in Attachment 4 to this SOW.

Based on the OU 1 ROD, the remedial response objectives of the Consent Decree for OU 1 regarding the management of contaminated ground water are as follows:

- Eliminate the threat posed to human health and the environment by preventing human ingestion of ground water contaminated by trichloroethylene ("TCE"), 1,1,1- trichloroethane ("TCA"), tetrachloroethylene ("PCE"), 1,2-Dichloroethane ("DCA"), and 1,1-Dichloroethylene ("DCE") above levels that exceed 1×10^{-4} cancer risk. These contaminants are the "Contaminants of Concern" ("COCs").

- Reduce the levels of COCs to Performance Standards set forth in Section III of this SOW.

- Perform ground water monitoring to demonstrate sustained compliance with the Performance Standards.

Based on the OU 9 ROD, the remedial response objectives of the Consent Decree for OU 9 regarding the management of contaminated soils are as follows:

- Eliminate the threat posed to the local ground water aquifer by preventing migration of contaminants from the soils to the ground water thereby minimizing the potential for further human exposure by ingestion of ground water contaminated by TCE, 1,1,1-TCA, PCE, 1,2-DCA and 1,1-DCE;

- Reduce the levels of COCs to the Performance Standards set forth in Section III of this SOW; and

- Conduct sampling of the soil-gas and the ground water to demonstrate compliance with the criteria set forth in Section III of this SOW.

B. Background Information

The EPA issued a Unilateral Administrative Order ("UAO") on September 28, 1990 requiring Respondents (Settling Defendants in this Consent Decree) to implement RD/RA work for OU 9 at the Subsite. Settling Defendant Dravo Corporation has been performing RD/RA work at the Subsite under this UAO. This work included installation of a soil vapor extraction ("SVE") system. The SVE Phase I system began operation in 1996. The Phase II SVE system modifications were not constructed.

The EPA issued a second UAO on March 8, 1993 requiring Respondents (Settling Defendants in this Consent Decree) to implement RD/RA work for OU 1 at the Subsite. Settling Defendant Dravo Corporation ("Dravo") has been performing RD/RA work at the Subsite under this UAO. Subsequent to EPA's issuance of the 1998 ROD Amendment, Dravo installed the Phase I Air Sparging ("AS") system and the Phase II and Phase III in-well aeration ("IWA") systems. The Phase II IWA system began operation in December 1999 and the Phase III IWA system began operation in November 2002. The Phase I AS system has not been operated.

A partial chronology of OU 1 and OU 9 activities is provided in Attachment 1 to this SOW.

II. DESCRIPTION OF THE REMEDIAL ACTION

A. Operable Unit 9

The following actions are required by this SOW to demonstrate compliance with requirements contained in the 1988 ROD:

- Modifications to the approved SVE Design for Phase II, subject to EPA approval;

- Installation/construction of the SVE Phase II wells, monitoring probes and other related equipment needed to fully implement the approved design;

- Operation of the SVE system and monitoring of the completed SVE well network (i.e., Phase I and II), to include collection of air samples from the SVE wells and monitoring probes, until Performance Standards are reached;

- Presentation of soil-gas data representing the condition of the soils after the completion of the prescribed number of rebound sampling events needed to demonstrate compliance with the criteria set forth in Table 2 of Section III, Performance Standards (three pump/equilibrate/sample cycles as described in Amendment 4 to the OU 9 UAO or the EPA-approved alternative to Amendment 4);

- Preparation of Status - Notification Reports to be submitted whenever scheduled or unscheduled system shutdowns occur lasting more than seven days;

- Preparation of Quarterly Progress Reports and Annual Remedial Action Reports; and

- Evaluation of ground water data collected within the vicinity of the SVE system and immediately downgradient.

B. Operable Unit 1

The following actions are required by this SOW to demonstrate compliance with requirements contained in the 1991 ROD.

- Continued operation and monitoring of the existing Phase II IWA ground water treatment system, until Performance Standards have been reached and EPA, in consultation with Nebraska Department of Environmental Quality (“NDEQ”), has determined that this response action is complete;

- Continued operation and monitoring of the existing Phase III IWA ground water treatment system, until Performance Standards have been reached and EPA, in consultation with NDEQ, has determined that this response action is complete;

- Completion of all work related to three additional ground water monitoring wells currently being installed by Settling Defendants pursuant to the August 22, 2005 and August 24, 2005 letters from Audrey B. Asher to Stephen Smith and Lawrence A. Demase (collectively the "August 2005 Letter Agreement") to supplement existing monitoring wells for the Phase III IWA system. The additional monitoring wells are being installed expeditiously to enable the collection of water quality data needed to assess the overall effectiveness of the Phase III system;

- Submittal of Status - Notification Reports whenever scheduled or unscheduled treatment system shutdowns occur lasting more than seven days;

- Submittal of Quarterly Progress Reports and Annual Remedial Action Reports;

- Ground water monitoring program to include periodic ground water sampling of selected wells upgradient, adjacent to and downgradient of the IWA treatment wells. The installation of additional monitoring wells may be required as part of the ground water monitoring system. The monitoring program will be designed to define the concentration of contaminants within the contaminant plume and to enable the Parties to determine if Performance Standards for the COCs have been met in areas of the plume surrounding and downgradient of the IWA treatment wells.

- Ground water monitoring to demonstrate continued compliance with Performance Standards. Submittal of OU 1 Area Ground Water Monitoring Reports in accordance with the Schedule in Section XIII of this SOW. The reports shall include an evaluation of annual ground water monitoring data to determine whether Performance Standards are being maintained in the area of the IWA wells and areas upgradient and downgradient of the IWA wells.

C. Provision for Further Response Actions

If notified by EPA pursuant to **Section VII (Remedy Review)** of the Consent Decree, Settling Defendants shall perform further response actions for the OU 1 Area and OU9; provided, however, EPA will not require Settling Defendants to perform further response actions for the Phase IV groundwater activities as defined by the Consent Decree.

D. Notification to EPA and NDEQ

Settling Defendants shall notify the EPA and NDEQ in writing at least two weeks in advance of all field Work.

III. PERFORMANCE STANDARDS

Performance Standards, defined in **Section IV (Definitions)** of the Consent Decree, are set forth in Tables 1 and 2 below.

The chemical-specific Applicable or Relevant and Appropriate Requirements ("ARARs") that address the ground water contamination are contained in the RODs. The COCs are TCE, 1,1,1-TCA, PCE, 1,2-DCA and 1,1-DCE. The Performance Standards have been developed to protect human health and the environment, as an interim measure. As set forth in the NCP, the final Remedial Action will achieve ARARs for the ground water or provide for a waiver.

Consistent with **Section VII (Remedy Review)** of the Consent Decree, Settling Defendants shall conduct studies and investigations as requested by EPA in order to permit EPA to conduct reviews, at least every five years, of whether the Remedial Actions are protective of human health and the environment.

A. Performance Standards for Ground Water

The methodology for collecting and evaluating ground water data shall be consistent with requirements contained in this SOW and shall be subject to review and approval by EPA, in consultation with NDEQ. The OU 1 Performance Standards are shown in Table 1.

TABLE 1

PERFORMANCE STANDARDS
FOR GROUND WATER
COLORADO AVENUE SUBSITE
HASTINGS GROUND WATER CONTAMINATION SITE

CONTAMINANT OF CONCERN	CONCENTRATION* *µg/l*
TCE	290
1,2-DCA	45
1,1,1-TCA	**
PCE	150
1,1-DCE	5

* Concentrations expressed in units of micrograms per liter (*µg/l*)are equivalent to parts per billion.
** 1,1,1-TCA is not classified as a carcinogen and is expected to be adequately treated by the processes being used to treat the ground water at the Subsite. The MCL for TCA is 200 *ug/l*.

B. Performance Standards for Soils

The Performance Standards for the soils, OU 9, have been developed to protect human health and the environment. One measure of project completion is based on sampling of the soil-gas within areas of known contamination over an area extending from approximately Kansas Avenue to about 200 feet east of the former Union Pacific Right of Way. The ultimate goals for the Subsite, as stated in the 1991 ROD, are based on the achievement of maximum contaminant levels ("MCLs") established under the Safe Drinking Water Act in the ground water. Therefore, Performance Standards listed below in Table 2 will be consistent with the ultimate goal for ground water at the Subsite and with the ground water quality standards contained in the Nebraska Ground Water Quality Standards (Title 118). Attainment of the Performance Standards shown in Table 2 will ensure that completion of OU 9 RA activities will be fully consistent with the final remediation goals for the Subsite.

The methodology for collecting and evaluating soil-gas data shall be consistent with requirements contained in this SOW and shall be subject to review and approval by EPA, in consultation with NDEQ. The OU 9 Performance Standards are shown in Table 2.

TABLE 2

PERFORMANCE STANDARDS
FOR SOIL GAS
COLORADO AVENUE SUBSITE
HASTINGS GROUND WATER CONTAMINATION SITE

CONTAMINANT OF CONCERN	CONCENTRATION* ppmv
TCE	0.25
1,2-DCA	0.10
TCA	15.00

PCE	0.30
1,1-DCE	1.50
* -Concentrations are expressed in units of parts per million volume.	

IV. KEY PERSONNEL

A. Designation of Project Coordinator

Lisa Potts shall be Settling Defendants' Project Coordinator. Robert Thomson shall be Settling Defendants' Alternate Project Coordinator. If Settling Defendants seek to change their Project Coordinator, they shall follow the procedure set forth in Paragraph 47 of the Consent Decree.

Pursuant to **Sections XI and XII (EPA Approval of Plans and Other Submissions and Project Coordinators)** of the Consent Decree and this Section of the SOW, the Settling Defendants' Project Coordinator shall be subject to disapproval by EPA. The Settling Defendants' Project Coordinator shall be responsible for the overall coordination and management of all activities required under the Consent Decree. The Project Coordinator may either be a member of the Settling Defendants' staff or an independent contractor. The Settling Defendants' Project Coordinator shall not be an attorney for the Settling Defendants in this matter. The EPA may require that Settling Defendants meet with EPA on an annual basis to discuss the performance and capabilities of the Project Coordinator. If EPA notifies Settling Defendants in writing that the performance of their Project Coordinator is not satisfactory, the Settling Defendants shall take action to correct the deficiency. If performance of the Settling Defendants' Project Coordinator continues to be deficient, Settling Defendants, upon receipt of written request from EPA and subject to the Dispute Resolution provisions in the Consent Decree, will propose a new Project Coordinator who shall be subject to disapproval by EPA and the process set forth in **Section XII (Project Coordinators)** of the Consent Decree.

B. Designation of Supervising Contractor

Christine L. Harwood of Michael Baker Jr., Inc. shall be Settling Defendants' Supervising Contractor.

In the event Settling Defendants elect to change the Supervising Contractor, then pursuant to **Section VI (Performance of Work by Settling Defendants)** of the Consent Decree and this Section of the SOW, the Settling Defendants' newly proposed Supervising Contractor shall be subject to disapproval by EPA. The new Supervising

Contractor may either be a member of the Settling Defendants' own staff or an independent contractor. The new Supervising Contractor shall be a professional with experience with hazardous waste remediation, including soils and ground water remediation and ground water monitoring.

The Settling Defendants' Supervising Contractor may assume the role(s) of Project Coordinator, RA Constructor or Quality Assurance Official with the following exception, the Supervising Contractor shall not assume both the role of RA Constructor and Quality Assurance Official.

The information submitted with the identification of the Settling Defendants' proposed Supervising Contractor will include a written statement of qualifications in sufficient detail to allow EPA to make a full and timely evaluation, including: 1) the proposed Supervising Contractor's professional reputation; 2) professional registration(s); 3) ground water remediation related experiences and qualifications specifically required for the project; 4) sufficient capacity in professional, technical and support staff to implement the project within the required schedule; and 5) sufficient business background and financial resources to provide uninterrupted services throughout the life of the project.

The EPA may require that Settling Defendants meet with EPA on an annual basis to discuss the performance and capabilities of their Supervising Contractor. If EPA notifies Settling Defendants in writing that the performance of their Supervising Contractor is not satisfactory, the Settling Defendants shall take action to correct the deficiency. If EPA determines that the performance of the Settling Defendants' Supervising Contractor continues to be deficient, Settling Defendants, upon receipt of written request from EPA, will propose a new Supervising Contractor, subject to the Dispute Resolution provisions in the Consent Decree.

V. DEED NOTICE AND ACCESS

Within thirty (30) days after entry of this Consent Decree, Owner Settling Defendant shall submit to EPA for EPA review and approval a notice to be filed with the Adams County Register of Deeds as described in **Section V (General Provisions), Paragraph 9** of the Consent Decree. Owner Settling Defendant shall record and certify the recording as set forth in **Section V (General Provisions), Paragraph 9** of the Consent Decree.

In accordance with **Section IX (Access and Institutional Controls)** of the Consent Decree, Settling Defendants shall provide EPA and its representatives with access to property to which access is required as necessary to effectuate the Consent Decree and this SOW, including areas where the installation, monitoring and sampling of ground water monitoring wells will be performed on properties not presently owned by the Settling Defendants. If the Settling Defendants do not own the property where access is needed, the Settling Defendants shall use best efforts to attain access for the purpose of

performing the Work.

VI. STATUS - NOTIFICATION REPORTS, PROGRESS REPORTS AND ANNUAL REMEDIAL ACTION REPORTS

Attachment 2 to this SOW identifies the elements required for Status - Notification Reports, Progress Reports and Remedial Action Reports.

In accordance with **Section X (Reporting Requirements)** of the Consent Decree, Settling Defendants shall submit Status - Notification and Progress Reports to EPA throughout implementation of the Work. Status - Notification Reports shall be submitted whenever a treatment system is taken out of service either for scheduled or unscheduled maintenance for a period lasting more than seven days. Progress Reports shall be submitted quarterly in accordance with the Schedule set forth in Section XIII herein. Remedial Action Reports shall be submitted annually and shall include results and evaluation/comparison of historical and current semi-annual sampling of ground water monitoring wells according to an approved plan.

Progress Reports and Remedial Action Reports shall include, but need not be limited to, information required to meet the reporting requirements set forth in **Section X (Reporting Requirements)** of the Consent Decree and Attachment 2 to this SOW. The EPA will notify Settling Defendants when Remedial Action Reports are no longer required.

VII. OU 1 REMEDIAL DESIGN/REMEDIAL ACTION

This section provides a summary of OU 1 RD/RA activities to be conducted within the OU 1 Area. The definition of the OU 1 Area is found in Section IV (Definitions), Paragraph 4 of the Consent Decree.

A significant part of the Subsite RD/RA Work has been completed. Operation of the existing ground water treatment systems shall continue, in compliance with the approved documents listed in Appendix E to the Consent Decree. The remaining RD/RA tasks include:

1) Preparation of planning documents to guide field and laboratory activities and reports described in this SOW;

2) Visual inventories/inspection of existing wells identified in Attachment 5 to this SOW;

3) Sampling and analysis of ground water according to approved plans as defined in this SOW;

4) Performance of a Current Status Sampling Event (defined in Task 4

below);

5) Conversion of the existing Phase I Air Sparge wells into ground water monitoring wells; and

6) Completion of all work related to the installation of three monitoring wells, pursuant to the August 2005 Letter Agreement, needed to support evaluation of the Phase III ground water treatment system.

Settling Defendants shall develop all plans and specifications in accordance with EPA's Superfund Remedial Design and Remedial Action Handbook, EPA 540/R-95/059,OWSER Directive 9355.0-4B and shall demonstrate that the Remedial Design will meet all objectives of the ROD, the Consent Decree and this SOW, including all Performance Standards. Settling Defendants shall communicate with EPA as necessary to discuss design issues. The Work Plan shall be prepared as set forth in this SOW and **Section VI (Performance of Work by Settling Defendants)** of the Consent Decree.

Task 1: OU 1 Work Plan

Pursuant to **Section VI (Performance of the Work by Settling Defendants)** of the Consent Decree, Settling Defendants shall submit to EPA and NDEQ a draft OU 1 Area Work Plan in accordance with the schedule set forth in Section XIII herein. Consistent with **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree, Settling Defendants shall address EPA's comments on the draft OU 1 Area Work Plan in a resubmittal, if so required. The OU 1 Area Work Plan will become final when approved by EPA.

Settling Defendants shall conduct all OU 1 Area activities in accordance with the schedule set forth in Section XIII herein and the following approved plans: the OU 1 Work Plan, the Sampling and Analysis Plan ("SAP"), the Quality Assurance Project Plan ("QAPP"), the Field Sampling Plan ("FSP"), and the O&M Plan. All plans must be approved by EPA before implementation of field Work. Settling Defendants shall provide the results of the sampling efforts to EPA and NDEQ in the formats required by this SOW, including Attachment 2 of the SOW.

The purpose of the OU 1 Area Work Plan is to set forth plans and schedules for those activities to be undertaken by the Settling Defendants to perform the remaining RD/RA Work that is necessary to implement the remedy selected in the 1990 ROD, as amended in 1998. Settling Defendants shall describe the overall management strategy for performing the OU 1 Area Work and shall include the RD/RA objectives, assumptions, limitations, and approaches. Settling Defendants shall include the following in the OU 1 Area Work Plan:

1) Description of responsibility and authority of all organizations and key

personnel involved with implementing the Work and a description of qualifications of key personnel directing the OU 1 Area Work, including contractor personnel;

2) Identify all permits currently held, and those to be obtained in connection with monitoring wells which will be installed, for each ground water well in the OU 1 Area which are owned by Settling Defendants and which are to be part of the OU 1 Area work to be performed;

3) Description of activities to be conducted in connection with investigations necessary for design and implementation of the OU 1 Work, to include a description of the existing access agreements and agreements needed and not already in place and the wells to be sampled, and a schedule for implementation of all OU 1 tasks identified in this Section;

4) Identify and inventory wells that may be used in developing the ground water monitoring program for Phase II and Phase III. For such wells, this inventory ("OU1 Area Well Inventory Report") shall include: a) field verification of all identified existing monitoring wells within OU 1 (location, status, and current depth); b) copies of all well construction records or a reference to a document previously submitted to EPA where all such records are available for review; c) all available analytical results from each well or a reference to a document previously submitted to EPA where all such records are available for review; d) monitoring well suitability review to identify wells for potential use in the long-term monitoring program; e) identification of any existing wells that need to be redeveloped or repaired; and f) proposed well locations and depths to close the data gaps identified.

5) A Well Cross Section Diagram ("WCSD") for wells in the OU 1 Area that identifies the vertical areas of the ground water monitoring well screens available for sample collection with the proposed new ground water monitoring wells (and well screens);

6) Updated Sampling and Analysis Plan to replace the February 1999 Ground Water SAP, including a combined Quality Assurance Project Plan and Field Sampling Plan. Settling Defendants may combine the revised documents into one plan. The SAP shall indicate that ground water samples are to be analyzed for the complete scan of volatile organic compounds ("VOAs") that are listed in Attachment 3 to this SOW, using a Gas Chromatography/Mass Spectometry ("GC/MS") analytical method. Requirements for the SAP and QAPP are set forth in Attachment 2 to this SOW.

7) Health and Safety Plan ("HSP"). Requirements for the HSP are set forth in Attachment 2 to this SOW.

8) Operation & Maintenance ("O&M") plan for the existing Phase II and Phase III ground water treatment systems.

Plans must be approved by EPA before implementation.

Task 2 : OU 1 Well Completion Report

The Well Completion Report shall include: the geologist's well logs, the well construction diagrams, a narrative description of the Work performed to include a discussion of any problems and problem resolution, a discussion of the Final Inspection including any outstanding items identified during the Final Inspection and a statement that outstanding items have been completed. Settling Defendants shall provide the Well Completion Report to EPA, according to the schedule contained in Section XIII of this SOW.

Task 3 : Current Status Sampling Event

A. Well Sampling

The next semi-annual ground water sampling shall be designated as the Current Status Sampling Event. The Current Status Sampling Event shall occur in the Spring or Fall (not in Winter or Summer), whichever season occurs first after entry of the Consent Decree and installation of new wells. The Current Status Sampling Event shall be conducted according to the approved SAP/QAPP and shall include sampling of preexisting and newly installed monitoring wells within the OU 1 Area. All samples shall be analyzed for the complete scan of VOAs listed in Attachment 3 to this SOW using a GC/MS method. Selected wells shall be sampled at multiple depths, if necessary to completely define the boundaries of the ground water plume and the depths of the different contamination levels.

B. Current Status Sampling Event Report

Settling Defendants shall document the Current Status Sampling Event in a Report that contains all the analytical data for the wells sampled. The report may supplant the OU 1 Annual Remedial Action Report and shall include summary tables showing detected contaminants by well, sample depth, contaminant type, and identity of wells/depths that exceed Performance Standards for COCs, referred to in Sections VI and VIII herein and further described in Attachment 2 to this SOW.

Settling Defendants shall submit the report to EPA and NDEQ, according to the schedule contained in Section XIII of this SOW.

Task 4: Shutdown of Phase II Wells and Continued Operation of Phase III Wells [Rest/Equilibrate/Test Sequence for Shutdown]

Pine Avenue

The process for shutdown of Phase II IWA wells begins when data from a regularly scheduled sampling event indicates that all IWA treatment well piezometers and all associated monitoring wells for the Pine Avenue system identified in Attachment 5 to this SOW are at or below Performance Standards listed in Section III herein.

Settling Defendants shall present all relevant data to EPA. If EPA agrees that the wells may be rested, EPA will so notify Settling Defendants in writing. After receiving written notice from EPA, Settling Defendants shall perform the following actions in the order listed below:

1) Settling Defendants shall rest the wells, allowing at least six months resting time for the ground water in the area of these wells to equilibrate.

2) After the rest cycle, all associated monitoring wells as defined above, shall be sampled.

3) After sampling, the two treatment wells shall be restarted.

4) After restart, the two treatment wells shall be operated for a minimum period of two months.

5) After the two month operating cycle, provided that the samples taken after the rest cycle are below the Performance Standards, Settling Defendants shall sample and analyze the influent and effluent air lines.

6) Settling Defendants shall conduct the next regularly scheduled semi-annual/annual ground water sampling event and shall include all wells previously sampled (as identified above).

7) The two Pine Avenue IWA treatment wells may be placed in a standby status if EPA agrees that the resulting ground water data show compliance with the Performance Standards. After three years of uninterrupted standby status, Settling Defendants may petition EPA to close the treatment system permanently. The treatment wells shall be operated one week per year during the time they are on standby status to demonstrate they are capable of

operation. In consultation with the NDEQ, EPA will respond to Settling Defendants' request.

Cedar Avenue Well

The process for shutdown of the Cedar Avenue IWA well begins when data from a regularly scheduled sampling event indicates that all IWA treatment well piezometers and all associated monitoring wells for the Cedar Avenue system listed in Attachment 5 to this SOW are at or below Performance Standards listed in Section III herein.

Settling Defendants shall present all relevant data to EPA. If EPA agrees that the wells may be rested, EPA will so notify Settling Defendants in writing. After receiving written notice from EPA, Settling Defendants shall perform the following actions in the order listed below:

1) Settling Defendants shall rest the well, allowing at least six months resting time for the ground water in the area of the well to equilibrate.

2) After the rest cycle, all associated monitoring wells as defined above, shall be sampled.

3) After sampling, the treatment well shall be restarted.

4) After restart, the treatment well shall be operated for a minimum period of two months.

5) After the two month operating cycle, provided that the samples taken after the rest cycle are below the Performance Standards, Settling Defendants shall sample and analyze the influent and effluent air lines.

6) Settling Defendants shall conduct the next regularly scheduled semi-annual/annual ground water sampling event and shall include all wells previously sampled (as identified above).

7) The Cedar Avenue IWA treatment well may be placed in a standby status if EPA agrees that the resulting ground water data show compliance with the Performance Standards. After three years of uninterrupted standby status, Settling Defendants may petition EPA to close the treatment system permanently. The treatment wells shall be operated one week per year during the standby period to demonstrate they are capable of operation. EPA in consultation with NDEQ, will respond to Settling Defendants' request.

Continued Operation of Phase III Wells

Settling Defendants shall operate the Phase III IWA system wells until all treatment well piezometers and all wells identified in Attachment 5 to this SOW are in compliance with the Performance Standards listed in Table 1 of Section III of this SOW. In addition, the Phase III IWA treatment wells shall not be placed in standby status until the Colorado Avenue Phase IV treatment system is determined by EPA to be fully operational or a period of six years from the effective date of the Consent Decree, whichever occurs first. Standby status requires the operation of wells for one week per year or for more time if recommended by the IWA system vendor.

Task 5: OU 1 Reports

A. Annual Remedial Action Report.

As described in Section VI of this SOW, Annual Remedial Action Reports shall be provided to EPA and NDEQ. This task describes the information to be presented in the OU 1 annual report. Settling Defendants shall prepare an annual report each year summarizing the ground water data and trends over time. This report shall:

1) Describe activities performed during the reporting period;

2) Present isoconcentration figures based on current ground water data to show the COC distribution in the aquifer and the extent of impact for COCs in the OU 1 Area;

3) Prepare a list of reports containing historical ground water data covering the previous five years;

4) Present two calculations of contaminant mass removal, one based on the use of vapor sample data and the other based on groundwater data. The calculations based on groundwater data shall be used solely to confirm the accuracy, in a order of magnitude, of the calculations based on vapor sampling data. Each of these calculations is outlined in Attachment 6 to this SOW;

5) Include data validation on all laboratory analytical data. The data validation package shall include the data review memorandum and a synopsis of the validated data and summary tables. The raw analytical data supporting the data validation process and summary tables shall be maintained by Settling

Defendants in accordance with **Section XXV (Record Retention)** of the Consent Decree;

6) Present all information supporting the results of Settling Defendants' evaluation and recommendations, including an evaluation of the migration of COCs in the ground water; and

7) Discuss system operation and maintenance issues, especially any shutdowns, their cause, when the shutdown was repaired and how Settling Defendants plan to prevent the shutdown from recurring.

The EPA will review the ground water monitoring data and Settling Defendants' Annual Remedial Action Report, consistent with **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree, to evaluate independently whether the Phase II and Phase III treatment systems are accomplishing their goals and meeting the Performance Standards in Table 1 of Section III of this SOW. The EPA will evaluate the overall protectiveness of the RA based upon monitoring data. EPA and NDEQ may require the installation of new treatment and/or monitoring wells if the existing network does not show contaminant capture or treatment of the plume.

B. OU 1 Status - Notification Reports

As described in Section VI herein, Settling Defendants shall inform EPA of all changes in status of all the OU 1 treatment systems when a system is out of service for more than seven days. The notice shall list the date when the system shut down, the suspected cause of the outage, and the repair schedule with anticipated date for restart. The information shall be delivered to the EPA within seven days by regular mail, fax or electronic mail. Settling Defendants shall only be required to provide a Status - Notification Report whenever the system is out of service for more than seven days.

C. Quarterly Progress Reports

Settling Defendants shall submit to EPA Quarterly Progress Reports according to the Schedule in Section XIII herein. The contents of the Quarterly Progress Reports shall conform to the requirements set forth in **Section X (Reporting Requirements)** of the Consent Decree and Attachment 2 to this SOW.

VIII. OU 9 REMEDIAL DESIGN/REMEDIAL ACTION

This section provides a summary of OU 9 activities and a description of RD/RA tasks to be performed. The definition of OU 9 is found in Section IV (Definitions), Paragraph 4 of the Consent Decree. A significant part of the Subsite RD/RA Work has been completed. Operation of the existing SVE system shall continue, in compliance with the approved documents listed in Appendix E to the Consent Decree. The additional RD/RA Work remaining is described in this section.

The RD/RA activities typically include planning, field data acquisition, sample analysis, data evaluation, and support activities. The OU 9 Work Plan shall also address implementation of the Phase II SVE design. A design for Phase II SVE has been submitted and approved, but circumstances have changed and revisions to the design will be required. The expected Work for OU 9 includes:

1) Implementation of the design which was submitted to EPA in 2001 and approved by EPA (Approved SVE Design) or modification of the approved SVE Design to reflect the deletion of the horizontal well in Area E and the installation of six vertical SVE wells (three shallow and intermediate pairs) at three locations and their associated monitoring probes in Area E;

2) Installation of two SVE wells and two multi-level monitoring probes in Area F (the area east of the former Union Pacific Railroad right of way);

3) Installation of two SVE wells and their associated vent wells designed to treat the shallow soils in Area A;

4) Connection of all the new SVE wells to the existing SVE blowers and piping; and

5) Sampling and analysis of soil-gas samples according to approved plans as defined by this SOW and included in Appendix E to the Consent Decree.

Task 1: OU 9 Work Plan

The OU 9 RD/RA activities shall be described in a Work Plan. The purpose of the Work Plan is to set forth plans and schedules for those activities to be undertaken by the Settling Defendants. The Work Plan shall include the final plans, drawings, specifications, general provisions, and special requirements necessary to implement the remedy selected in the OU 9 ROD, pursuant to the Consent Decree.

Pursuant to **Section VI (Performance of the Work by Settling Defendants)** of the Consent Decree, Settling Defendants shall submit to EPA and NDEQ a draft OU 9 Work Plan in accordance with the schedule identified in Section XIII of this SOW. The Work Plan shall describe the overall management strategy for performing the OU 9 Work. The RD/RA objectives, assumptions, limitations, and approaches will be defined. Settling Defendants shall submit a final OU 9 Work Plan addressing EPA's comments on the draft OU 9 Work Plan in accordance with the schedule in Section XIII of this SOW. The OU 9 RD Work Plan will include the following items:

1) Description of responsibility and authority of all organizations and key personnel involved with the implementation, including a description of qualifications of key personnel directing the Work, (e.g. contractor personnel);

2) Identification of standards and regulations that are applicable or relevant and appropriate to the design, including permitting requirements;

3) Description of activities to be conducted in connection with investigations necessary for design and implementation of the OU 9 Work, to include the obtaining of access agreements and the sampling of wells, and a schedule for implementation of all OU 9 tasks identified in this Section;

4) Identify and inventory all available monitoring probes and SVE wells within OU 9 (defined in the Consent Decree), as set forth in the approved designs, which are necessary to evaluate Phase I and Phase II treatment systems. For such wells, this inventory shall include: a) field verification of all identified existing monitoring probes and wells within OU 9 (location, status, and depth); b) copies of construction records or a reference to documents previously submitted to EPA where all such records can be found; c) review of monitoring data including reports and correspondence to identify current status of the monitoring point, and d) list of existing SVE wells or monitoring probes that need to be tested and/or repaired;

5) Updated SAP, QAPP and FSP. The Settling Defendants may combine these revised documents into one plan. Requirements for the SAP, QAPP, and FSP are set forth in Attachment 2 to this SOW;

6) HSP– requirements for the HSP are set forth in Attachment 2 to this SOW; and

7) O&M plan for the existing Phase I and planned Phase II SVE system wells.

Task 2: Design and Installation of Phase II SVE Components

Consistent with the schedule contained in Section XIII of this SOW, Settling Defendants shall:

1) Notify EPA in writing whether Settling Defendants intend to proceed in accordance with the 2001 Design approved by EPA or to modify the existing Design for Phase II in accordance with the schedule in Section XIII of this SOW;

2) Install necessary SVE wells in Areas A, E and F, and connect them to the SVE system;

3) Install the new monitoring probes; and

4) Install the new vent wells in Area A.

A. Modified Remedial Design for Phase II SVE

If Settling Defendants elect to prepare a Modified Design for the Phase II SVE project, then the Modified Design will delete the excavation work and the proposed horizontal well in Area E. Instead, the design shall include three to six vertical SVE wells to be installed at three locations in Area E to address the highest levels of contamination found in the Subsite data for soils and soil-gas sampling conducted in 1999 and 2004. In addition, the Modified Design shall include provisions for: a) multi-level monitoring probes in Area E, as needed; b) replacing MP-4S; and c) procedures for leak-testing MP-2D, and repairing as necessary. The Modified Design shall be submitted to EPA according to the schedule contained in Section XIII of this SOW.

The EPA, in consultation with NDEQ, will review the Modified Design, consistent with **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree.

B. Demonstration of Compliance at MP-4s and MP-2d

If the Settling Defendants propose a Modified Design but elect not to repair and test monitoring probes MP-4s and/or MP-2d, as specified in A above, Settling Defendants shall demonstrate compliance with performance standards at location MP-4s and/or location MP-2d by alternative means. Settling Defendants shall submit a Monitoring

Probe Testing deliverable consisting of all work plans, sampling and quality assurance plans appropriate to performance of a demonstration that subsurface areas surrounding the respective monitoring probe depths are in compliance with the performance standards shown in Section III of this SOW. Settling Defendants shall submit the Monitoring Probe Testing deliverable to EPA consistent with the schedule shown in Section XIII of this SOW for the Modified OU 9 Design.

C. Construction Quality Assurance Plan

The Settling Defendants shall provide the CQAP to EPA in conformity with the schedule in Section XIII of this SOW. The CQAP shall include activities related to the well installation, connection to the existing system and all other construction related activities. Procedures and plans for the decontamination of equipment and the disposal of contaminated materials shall be included in the CQAP. Requirements for the CQAP are set forth in Attachment 2 to this SOW.

D. Preconstruction Conference

The Settling Defendants shall participate with the EPA (and NDEQ at NDEQ's option) in a Preconstruction Conference. The purpose of the conference is to verify the locations of the new wells and monitoring probes and the existing systems and to review the following:

- Work to be performed and areas of the Subsite affected;
- Methods for documenting Work activities and submittal of Construction Status Reports;
- Work area security and safety protocols; and
- O&M procedures.

Settling Defendants shall prepare minutes of the meeting and transmit them to EPA and NDEQ. The EPA, in consultation with NDEQ, may waive the requirement for a pre-final inspection.

E. SVE Well, Vent Well and Monitoring Probe Installation

Following EPA approval of the OU 9 Work Plan, Settling Defendants shall install the SVE wells, vent wells, and monitoring probes as set forth in the 2001 design approved

by EPA or the approved Modified Design. In addition, Settling Defendants shall repair, replace, or redevelop wells or probes that are in disrepair.

Task 3: Pre-final Inspection Report and Final Inspection

A. Pre-final inspection

Upon preliminary completion of the construction phase of the OU 9 Work, and in conformity with the schedule in Section XIII of this SOW, Settling Defendants shall notify EPA and NDEQ for the purposes of conducting a pre-final inspection. The pre-final inspection shall consist of a walk-through inspection by EPA, NDEQ (at NDEQ's option) and Settling Defendants of the entire operable unit, with an emphasis on the new SVE wells, monitoring wells, and monitoring probes and the Work done to connect the new SVE wells to the existing system. The inspection is to determine whether the implementation/construction portion of the project is complete and consistent with the contract documents and the EPA approved RD. Any outstanding implementation or construction items discovered during the inspection shall be identified and noted jointly by the Parties. The Settling Defendants shall prepare the Pre-final Inspection Report outlining the outstanding implementation or construction items, if any, actions required to resolve outstanding items, completion date for these items, and a proposed date for final inspection, if determined by EPA to be needed.

B. OU 9 Final Inspection

Upon completion of any outstanding implementation or construction item, Settling Defendants shall notify the EPA and NDEQ for the purposes of conducting a Final Inspection. The Final Inspection shall consist of a walk-through inspection of OU 9 (both preexisting and new Work) by EPA, NDEQ (at NDEQ's option) and Settling Defendants. The Pre-final Inspection Report shall be used as a checklist with the final inspection focusing on the outstanding implementation or construction items identified in the pre-final inspection. The EPA will provide confirmation that outstanding items have been resolved. Final inspections shall be repeated if EPA deems necessary.

Task 4: Construction Completion Report and O&M Manual

Following completion of the construction at the Subsite and in conformity with the schedule in Section XIII of this SOW, the Settling Defendants shall provide the following documents to EPA and NDEQ.

A. OU 9 Construction Completion Report

The Construction Completion Report shall include: copies of all "as-built" drawings, the geologist's well logs, well construction diagrams, a narrative description of the work performed to include a discussion of any problems and problem resolution, a discussion of the Final Inspection including any outstanding items identified during the Final Inspection and a statement that outstanding items have been completed. Settling Defendants shall provide the OU 9 Construction Completion Report to EPA, in conformity with the schedule contained in Section XIII of this SOW.

B. Operation & Maintenance Manual

Settling Defendants shall revise the O&M manual for the existing Phase I SVE Treatment System to include the necessary changes to operate the Phase II SVE wells and other necessary updates since the system was constructed. Settling Defendants shall submit the revised O&M Manual to EPA and NDEQ in conformity with the schedule in Section XIII of the SOW.

Task 5: Current Status Sampling Event

Upon completion of the new SVE wells, monitoring probes, and Work required by the approved Design, Settling Defendants shall conduct the Current Status Sampling Event in accordance with the approved SAP and QAPP and OU 9 Work Plan schedule. The event will include sampling of preexisting and newly installed SVE wells and monitoring probes. Settling Defendants shall analyze soil-gas samples for COCs and shall evaluate available ground water data for trends over time as the ground water quality may be correlated to SVE remediation activities.

Settling Defendants shall submit the sample results from the Current Status Sampling for all the SVE wells and monitoring probes sampled in a report that includes summary tables showing detected contaminants by well and probe, sample depth, and lists the wells and probes where the COCs were found above the Performance Standards. The OU 9 Current Status Report shall supplant the Annual Remedial Action Report for the subject year and shall be submitted in conformity with the schedule in Section XIII of this SOW.

Task 6: OU 9 Reports

A. Annual Remedial Action Report

As described in Section VI, Annual Remedial Action Reports shall be provided to EPA and NDEQ. This task describes the information to be presented in the OU 9 annual report. Settling Defendants shall prepare a Remedial Action Report each year summarizing the soil vapor data for the year. This Remedial Action Report shall:

1) Describe activities performed during the reporting period.

2) Tabulate the soil-gas data or provide a reference to a document previously submitted to EPA where the data can be found, and prepare isoconcentration figures to show the TCE and PCE distribution in the soils.

3) Use the methods approved by EPA in Amendment 4 or the EPA/NDEQ approved alternative procedure submitted by Settling Defendants to evaluate the Phase I and II treatment systems, determine the rates of contaminant removal, and identify the wells/monitoring probes that are in compliance with Amendment 4 (or the approved alternative) and Performance Standards for the COCs.

4) Include data validation on all laboratory analytical data for COCs. The data validation package shall include the data review memorandum and a synopsis of the validated data and summary tables. The raw analytical data supporting the data validation process and summary tables shall be maintained by Settling Defendants in accordance with **Section XXV (Record Retention)** of the Consent Decree.

5) Report rates of contaminant removal for the COCs.

6) Present all information supporting the results of Settling Defendants' evaluation and recommendations.

7) Discuss system operation and maintenance issues, especially any shutdowns, their cause, when the shutdown was repaired and how Settling Defendants plan to prevent the shutdown from recurring.

The EPA will review the soil treatment monitoring data and Settling Defendants' Annual Remedial Action Report, consistent with **Section XI (EPA Approval of Plans and**

Other Submissions) of the Consent Decree, to evaluate independently whether the Phase I and Phase II treatment systems are accomplishing their goals and meeting the Performance Standards in Section III. The EPA will evaluate the overall protectiveness of the RA based upon monitoring data. EPA and NDEQ may require the installation of new SVE or monitoring wells or monitoring probes if the existing network does not allow for soil contaminant capture or delineation of soil and ground water contamination.

B. OU 9 Status - Notification Reports

As described in Section VI herein, Settling Defendants shall inform EPA of all changes in status of all the OU 9 treatment systems. The notice shall include the date when the system shut down, the suspected cause of the outage, and the repair schedule with anticipated date for restart. The information shall be delivered to the EPA within seven days by regular mail, fax or electronic mail.

C. Quarterly Progress Reports

Settling Defendants shall submit to EPA Quarterly Progress Reports according to the Schedule in Section XIII herein. The contents of the Quarterly Progress Reports shall conform to the requirements set forth in Section X (Reporting Requirements) of the Consent Decree and Attachment 2 to this SOW.

IX. OPERATION AND MAINTENANCE

Operation and maintenance (O&M) activities for the OU 1 Area and OU 9 remedial activities are ongoing and will continue during preparation of the revised O&M plans described in Sections VII and VIII of this SOW. The O&M activities shall include all activities required to maintain the effectiveness of the OU 1 Area ground water and OU 9 SVE treatment systems and provide capability for sampling needed to demonstrate compliance as described in Section III, Performance Standards and Section X, Performance Monitoring of this SOW. O&M activities will change after EPA advises Settling Defendants that active remediation activities are complete and post-treatment monitoring, as described in Section X of this SOW, is to be initiated. O&M shall include any necessary operational monitoring of the treatment systems, such as effluent vapor monitoring for the SVE system and the Phase II and III ground water treatment systems.

Sampling for the purpose of demonstrating attainment of the Performance Standards during RD/RA activities is covered under Sections VII and VIII of this SOW. Sampling to demonstrate attainment of the Performance Standards after completion of RA construction is covered in Section X, Performance Monitoring. All activities will be

conducted in accordance with the approved OU 1 and OU 9 Work Plans and the other approved plans identified in Sections VII and VIII of this SOW.

O&M tasks defined below include:

1) O&M of the OU 9 SVE and OU 1 Area ground water treatment systems;

2) Operational sampling and monitoring of the OU1 Area and OU 9 treatment systems; and

3) Maintenance of the monitoring wells and monitoring probes.

Task 1: O&M of OU 1 Area and OU 9 Treatment Systems

Settling Defendants shall be responsible for conducting all necessary O&M activities for the OU 1 Area and OU 9 treatment systems. Settling Defendants shall: 1) keep the systems operational to the maximum extent possible; 2) rapidly repair any problems with the systems; and 3) within seven business days of all scheduled and unscheduled system shutdowns, provide EPA with notification that the system is not operational, a description of the reason for the shutdown, and an estimate of how long repairs will take. For all unscheduled shutdowns lasting more than thirty days, the Settling Defendants shall provide EPA with bi-weekly (every two weeks) updates to the Status - Notification Report and a final update when the shutdown has ended to notify EPA that the system is operational again.

The necessary reports are further detailed in the Status - Notification Report subsection of Section VI of this SOW. If the timing for a Status - Notification Report or Status - Notification Report Update coincides with the submittal of a Progress Report or an Annual Remedial Action Report, the information may be combined into the larger report. If such status reporting information is merged into a larger report, the Settling Defendants' cover letter shall note that status reporting information has been included in the larger report.

Settling Defendants shall ensure systems that have been shut down or placed in a standby status are fully capable of being restarted, if needed. Periodic operation of the idled systems shall be documented in the quarterly Progress Reports to allow EPA to verify operability of the treatment systems.

Task 2: Operational Sampling of OU 1 Area and OU 9 Treatment Systems

Settling Defendants shall be responsible for conducting all necessary operational sampling for the OU 1 Area and OU 9 treatment systems. Settling Defendants shall: 1) monitor the Phase II and Phase III ground water treatment influent and effluent vapor as often as necessary, but at least quarterly, to ensure that contaminants have not saturated the vapor phase granular activated carbon ("GAC"); 2) collect ground water levels at least monthly for the Phase II and Phase III IWA piezometers, to ensure that the systems are not plugged; 3) monitor the combined Phase I and Phase II SVE system vapor effluent to demonstrate that untreated vapor emissions are not a threat to public health and to show that carbon treatment of air emissions is not needed; and 4) collect the individual SVE well vapor samples necessary to optimize the operation of the combined Phase I and Phase II wells.

Task 3: Maintenance of Wells and Monitoring Probes

Settling Defendants shall be responsible for conducting all maintenance of the monitoring wells, SVE wells and monitoring probes necessary to evaluate the OU 1 Area and OU 9 treatment systems. Settling Defendants shall, as often as necessary, but at least during all sampling events, inspect all the monitoring probes or monitoring wells sampled for damage or wear. Settling Defendants shall inspect any wells or probes that are not sampled periodically (such as monitoring probes that are in the No Further Sampling Required category) at least annually. Wells and monitoring probes shall be inspected for damage to the surface pad and well box or surface casing. All inspections shall be documented, preferably with photographs. The results of the inspections, and any repairs planned or completed, shall be included in the Progress Reports. Water wells shall be measured for total depth and any wells that are more than two feet shorter than their installed depth shall be redeveloped. Any water wells that pump dry shall be redeveloped. Any damaged monitoring probes shall be repaired or replaced and after repair/replacement shall be leak tested for integrity and communication with the subsurface.

X. PERFORMANCE MONITORING

Settling Defendants shall conduct Performance Monitoring at both the OU 1 Area and OU 9 to ensure that all Performance Standards are met. The Performance Monitoring shall be conducted according to the updated and EPA approved QAPP, SAP, and HSP for each OU. Performance Monitoring is distinct from operational monitoring. Performance Monitoring provides data on the overall progress of the remediation of the

two OUs, while operational monitoring is designed to ensure that the treatment systems are operating properly.

Performance Monitoring consists of three tasks: 1) Remedial Action Performance Monitoring; 2) Demonstration of Compliance Monitoring, and; 3) Post-Treatment Monitoring.

Task 1: Remedial Action Performance Monitoring

The Settling Defendants shall monitor the OU1 Area treatment systems and the OU 9 treatment system to ensure that the systems are performing effectively and are meeting the Performance Standards in Section III of this SOW, or are trending toward meeting the Performance Standards.

Performance Monitoring for OU 1 Area shall include bi-annual (twice yearly) sampling of all of the monitoring wells listed in the approved OU 1 Area Well Inventory Report (included in the OU 1 Area Work Plan). Performance Monitoring for OU 9 shall include monitoring of the soil by collection of soil-gas samples from the OU 9 Phase I and II SVE wells and monitoring probes. The soil-gas sampling shall occur at least annually and shall follow the requirements of Amendment 4 to the OU 9 UAO or the EPA approved alternative to Amendment 4. All SVE wells and monitoring probes shall be sampled at least annually, except for those SVE wells and monitoring probes that the EPA has listed in the No Further Sampling Required category. Results of Performance Monitoring sampling will be presented in the Quarterly Progress Reports and will be evaluated in detail in the Annual Remedial Action Reports to be submitted as set forth in Section VI of this SOW.

Task 2: Demonstration of Compliance Monitoring

The Performance Monitoring for the OU 1 Area and OU 9 shall continue until the Performance Standards listed in Section III of this SOW are met. Once the standards for either OU are met, the Settling Defendants shall inform the EPA, either in the Annual Remedial Action Report or in a separate letter report (Demonstration of Compliance Report), at the Settling Defendants' option. The reports for the OU 1 Area and OU 9 are subject to EPA review, pursuant to **Section X (Reporting Requirements)** of the Consent Decree.

A. OU 9 Report

The OU 9 report stating that Performance Standards for OU 9 have been met shall contain the following statement:

> "Analytical data for all monitoring probes and all SVE wells representing a minimum of three sampling events as described in Amendment 4 to the UAO are in compliance with the OU 9 Performance Standards or the Amendment 4 requirements, as applicable, and all remaining sampling locations have been classified by EPA as No Further Sampling Required."

In addition, the OU 9 report may contain Settling Defendants' request to EPA to shut down the SVE system. When EPA approves the OU 9 report, this report shall be considered the Final OU 9 Annual Report.

B. OU 1 Report

The OU 1 report stating that Performance Standards for OU 1 Area have been met shall contain the following statement:

> "Analytical data for all Phase III monitoring wells and all piezometer samples from the two latest sampling rounds consistent with the methodology described in Section VII, Task 5, of the SOW are in compliance with the OU 1 Area Performance Standards."

Upon notice by EPA of approval of the OU 1 Area Annual Remedial Action Report stating that Performance Standards for the OU 1 Area have been met, Quarterly Progress Reports will no longer be required. Settling Defendants shall include in the OU 1 report either a revised SAP or a listing of the ground water monitoring wells that shall be sampled annually for the ten years of Post-Treatment Monitoring as described in Task 3 below. In addition, the OU 1 Area report may contain Settling Defendants' request to EPA to shut down the ground water treatment systems.

Task 3: Post-Treatment Monitoring

Settling Defendants shall be responsible for monitoring the continued effectiveness of the OU 1 Area and OU 9 remedial actions. Once the requirements of the Performance Standards listed in Section III of this SOW have been fully satisfied, (indicated by EPA accepting the Demonstration of Compliance Report for the OU 1 Area referenced in Task 2 above), in conformity with the Schedule in Section XIII of this

SOW, Settling Defendants shall submit a Ground Water Monitoring Plan which identifies wells to be monitored annually for ten years. This plan shall be subject to EPA review as set forth in **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree. Settling Defendants shall implement the monitoring plan after notice from EPA and in accordance with the Schedule in Section XIII of this SOW. Settling Defendants shall commence annual sampling of all wells on the approved list for the VOAs set forth in Attachment 3 to this SOW on the date that EPA identifies in its letter approving the Ground Water Monitoring Plan. All samples shall be analyzed using a GC/MS method. Settling Defendants shall include ground water monitoring data in its annual reports.

Settling Defendants shall maintain the OU 1 Area and OU 9 treatment systems in standby consistent with the provisions contained in Sections VII and IX of this SOW. Therefore, no treatment or monitoring wells or monitoring probes shall be abandoned except as provided in this SOW. The treatment systems shall be operated one week per year (or, more frequently if recommended by equipment vendors) to demonstrate that they are capable of operation.

All monitoring wells, SVE wells, and monitoring probes used to monitor both OUs shall be inspected annually and the results of the inspection provided to EPA in the next Annual Report. Damaged or unusable wells or probes shall be listed. The Settling Defendants shall comply with all State rules pertaining to wells, however, the EPA will determine if a damaged well must be repaired/replaced or if the well can be abandoned in accordance with NDEQ rules. If so directed by EPA, the Settling Defendants shall complete all well abandonment activities within six months of receipt of notification from EPA.

Settling Defendants shall present ground water monitoring data in their Post-Treatment Monitoring Reports. Post-treatment Monitoring Reports shall comply with items 1, 2, 3, 5, and 6 of Section VII, Task 5 of this SOW.

Task 4: Completion of OU 9 Work

In the event that all OU 9 work requirements are fully satisfied prior to completion of the ground water monitoring specified in Task 3 above, and upon notification by EPA, the Settling Defendants may decommission the SVE system. If requested by EPA, the Settling Defendants shall submit the OU 9 RA Completion Report in conformity with the schedule in Section XIII of this SOW.

The OU 9 RA Completion Report shall address all requirements contained in Section XI, C. Completion of Work, parts 1-5 of this SOW. The report will be subject to EPA review pursuant to **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree. If the report is approved, the EPA will provide a schedule for decommissioning of the SVE system and abandonment of the wells and monitoring probes.

XI. WORK COMPLETION CERTIFICATION

Upon completion of the ground water monitoring requirements discussed in Section X of this SOW, the EPA will notify the Settling Defendants that ground water monitoring requirements have been satisfied and that the Project Completion Request should be submitted to EPA.

A. Project Completion Request

Within 90 days after receipt of such notice, the Settling Defendants shall submit a Project Completion Request, which shall include, but not be limited to:

1) A statement signed by a registered professional engineer and the Settling Defendants' Project Coordinator stating that based on the reports submitted pursuant to the Consent Decree and SOW and his information and belief, the Work, except for the Project Completion Work Plan, has been completed in full satisfaction of the requirements of the Consent Decree and this SOW;

2) A brief chronology of Work performed during the Work, including a discussion of the implementation of all project plans;

3) All analytical data obtained during the Post-Treatment Monitoring Phase of the Work;

4) A discussion of all analytical data obtained during the post-Remedial Action Monitoring described in Section X of this SOW, including an explanation of how the data demonstrates attainment of Performance Standards and compliance with the objectives of the ROD and the Consent Decree;

5) A description of any modified Performance Standards;

6) Estimates of mass removed for each of the COCs based on the monitoring data of the mass depleted versus time from selected monitoring locations identified

along the plume path;

7) A discussion of any problems encountered and corrective action taken;

8) A Project Completion Plan which supplements all the plans previously submitted pursuant to this SOW. The Project Completion Plan shall include, but need not be limited to, a description of completion activities, a proposed schedule for the completion activities and identification of potential problems and concerns; to include procedures for abandonment of ground water treatment wells, ground water monitoring wells, SVE extraction wells and SVE monitoring probes in accordance with state of Nebraska requirements, removal of any equipment used in the treatment of soils and/or ground water, and restoration of the Subsite and other affected properties; and

9) At EPA's request, Settling Defendants shall schedule a pre-completion meeting to discuss the system's performance, monitoring results and the proposed completion activities. In addition to EPA, Settling Defendants shall invite other parties with a jurisdictional interest (e.g., state and local officials) to participate in the meeting. The EPA will assist Settling Defendants in identifying appropriate parties to be notified.

B. Implementation of Project Completion Plan

Settling Defendants shall begin Project Completion activities within 60 days after receipt of EPA approval of the Settling Defendants' Project Completion Request. All project completion activities conducted by Settling Defendants shall comply with the State of Nebraska ARARs.

C. Completion of Work

Work shall be considered complete when the Settling Defendants have completed all remedial activities as set forth in the Work Plans and the Project Completion Plan and have completed activities in accordance with **Section XIV (Certification of Completion)** of the Consent Decree.

Within 90 days after Settling Defendants conclude all project completion activities, Settling Defendants shall schedule and conduct a pre-certification inspection with EPA as specified in **Section XIV, Paragraph 54.a (Certification of Completion)** of the Consent Decree. EPA will notify Settling Defendants of any remaining Work that needs to be performed in order for EPA to consider the Work completed. Within 30

days after receipt of notice by EPA, Settling Defendants shall schedule the RA Final Inspection and participate with EPA in conducting the inspection. The purpose of the RA Final Inspection is to verify completion of the Work.

A Completion of Work Certification Report ("Report") shall be submitted by Settling Defendants within 45 days after the RA Final Inspection. The Report shall request EPA's approval of all Work completed pursuant to the Consent Decree.

Settling Defendants' Report and shall include, but need not be limited to:

1) A statement signed by a registered professional engineer and Settling Defendants' Project Coordinator that all phases of Work have been completed in full satisfaction of the requirements of the Consent Decree and this SOW;

2) A brief chronology and description of all Work performed including a discussion of the implementation of all project plans, including the Project Completion Plan;

3) All analytical data obtained during the Post-Treatment Monitoring Phase of the Work;

4) A discussion of monitoring data which shall include, but need not be limited to, an explanation of how the data demonstrate verification of Performance Standards and compliance with the objectives of the ROD and the Consent Decree;

5) A description of any significant project difficulties and how they were resolved;

6) A summary of project costs including a comparison to project cost estimates; and

7) The certification specified in **Section XIV, Paragraph 54.a (Certification of Completion)** of the Consent Decree, signed by a responsible corporate official of a Settling Defendant.

XII. ROLE OF EPA

The EPA's role during the performance of the Work will be to oversee and monitor the design, construction, sampling and reporting activities to be undertaken by the Settling Defendants. Oversight may include oversight of SVE and monitoring well and monitoring probe installation activities, connection of new SVE wells to the existing system, EPA sampling activities, and the collection of split samples during Settling Defendants' sampling events. Settling Defendants shall assure access so that

oversight by EPA can occur. EPA may also conduct Final Inspections as outlined in this SOW.

The EPA may collect primary and split samples for quality assurance purposes and for purposes of verifying attainment of Performance Standards, as specified in **Section VIII (Quality Assurance, Sampling, and Data Analysis)** of the Consent Decree. The Settling Defendants shall assist the EPA's oversight personnel with all sample collection activities at the Subsite. The amount of oversight will depend on the demonstrated capabilities of the Settling Defendants' project team and the adherence to procedures including quality assurance measures and provisions contained in the Consent Decree.

EPA's approval of submittals is administrative in nature to allow the Settling Defendants to proceed to the next step in implementing the Work. It does not imply any warranty of performance or that the RD or RA, when constructed, will meet Performance Standards or will function properly and be accepted.

Pursuant to **Section XI (EPA Approval of Plans and Other Submissions)** of the Consent Decree, EPA retains the right to disapprove of Settling Defendants' submittals, subject to the Dispute Resolution provisions in the Consent Decree. The EPA may disapprove any contractor, plan and specification, process, or other submittal as provided by the Consent Decree, subject to the Dispute Resolution provision in the Consent Decree.

XIII. SUBMISSIONS AND ACTIVITY SCHEDULE

A summary of the reporting and work requirements for the Consent Decree is presented below:

Submission or Activity	Due Date
1. Notice to EPA indicating which OU 9 Phase II SVE design will be implemented	Within in 10 days of lodging the Consent Decree or by December 22, 2005, which ever is later
2. Change of Project Coordinator, Alternate Project Coordinator, or Supervising Contractor Notice	5 days prior to change as specified in the Consent Decree
3. Alternative to Amendment 4 Process	Within 10 days of Entry of the Consent Decree
4. Reimbursement of Past Costs	Within 30 days of Entry of the Consent Decree
5. Establish Financial Security	Within 30 days of Entry of the Consent Decree
6. Deed Notice for EPA Review	Within 30 days of Entry of the Consent Decree
7. Record Notice in Adams County	Within 10 days of EPA Approval
8. Transmit Certified Copy of Deed Notice	Within 10 days of Recording Notice
9. Access Agreements	Within 45 days of Request by EPA
10. Status - Notification Reports	Within 5 days of System Shutdown
11. Quarterly Progress Reports	May 10, August 10, November 10, and February 10
12. OU 1 Area Remedial Action Report	February 15, yearly
13. OU 9 Remedial Action Report	March 15, yearly
14. Post-Treatment Monitoring Reports	Next February 15th after notification from EPA that OU1 treatment is complete, and annually thereafter for 10 years
15. Notification of Field Work	14 days prior to start of Field Work
16. OU 1 Area RD/RA Work Plan	Within 90 days of Entry of the Consent Decree
17. OU 1 Area Well Inventory and WCSD	Within 90 days of Entry of the Consent Decree

18. OU 1 Area SAP/QAPP/FSP	Within 90 days of Entry of the Consent Decree
19. Health & Safety Plan	Within 90 days of Entry of the Consent Decree
20. OU 1 Area O & M Plan	Within 90 days of Entry of the Consent Decree
21. Begin Monitoring Well Installation	October 18, 2005 for the three wells currently being installed in accordance with the August 2005 Letter Agreement
22. OU 1 Area Final Inspection of Wells, Notice	Within 20 days after Well Installation
23. Monitoring Well Final Inspection	Within 30 days after Well Installation
24. OU 1 Area Construction Completion Report	Within 45 days after Final Inspection
25. OU 1 Area Current Status Sampling Report	February 15, 2006 or 60 Days after next Semi-Annual Sampling
26. OU 1 Area Section VII, Task 5 Report	August 15 or February 15, whichever occurs first after completion of rest/test and retest cycles
27. OU 9 RD/RA Work Plan	Within 60 days of Entry of the Consent Decree
28. OU 9 Inventory of Existing Wells/Probes	Within 60 days of Entry of the Consent Decree
29. SAP/QAPP/FSP	Within 60 days of Entry of the Consent Decree
30. OU 9 O&M Plan	Within 60 days of Entry of the Consent Decree
31. Modified OU 9 Remedial Design, if required	Within 60 days of Entry of the Consent Decree
32. OU 9 CQAP	Within 45 days of Entry of the Consent Decree
33. OU 9 Preconstruction Conference	Within 30 days after approval of Design and CQAP
34. Begin SVE Phase II Construction	Within 10 days after OU 9 Pre-Construction Conference
35. OU 9 Notice for Pre-final Inspection	After 90% Completion of Construction
36. OU 9 Pre-Final Inspection Report	Within Ten days after Pre-final Inspection
37. OU 9 Final Inspection	Within Ten days after Completion of Construction
38. OU 9 Construction Completion Report	Within 45 days After Final Inspection
39. OU 9 Current Status Sampling Report	Within 120 days after Completion of Construction

40. Ground Water Monitoring Plan	Within 30 Days after EPA Notice
41. OU 9 Shutdown Request	To Accompany Demonstration of Compliance Report
42. Begin OU 9 Project Completion Activities	Within 60 days after EPA Approval of Request
43. OU 9 RA Final Inspection	Within 30 days after Project Completion Activities
44. OU 9 RA Completion Report	Within 60 days after Final Inspection
45. OU 1 Project Completion Request	To Accompany Phase III Demonstration of Compliance Report
46. Project Completion Request	90 Days after Receipt of EPA Notice
47. Project Completion Plan	90 Days after Receipt of EPA Notice
48. Implement Project Completion Activities	60 Days after EPA Approval of Request
49. Pre-Certification Inspection	90 Days after RA Completion Activities
50. Certification of Completion of Work	45 Days after Pre-Certification Inspection
51. RA Final Inspection	30 Days after Receipt of EPA Notice

ATTACHMENT 1
CHRONOLOGY OF EVENTS

1984	Monitoring Wells (OW-1, -2, -3,-4,-5) are installed by State of Nebraska
1985	EPA performs soil-gas survey for Hastings Site (Woodward-Clyde)
1986	EPA performs soil and soil-gas sampling(Woodward-Clyde) at subsite
1987	EPA Report of Investigation, Colorado Avenue (Woodward-Clyde)
1987	EPA Ground Water Evaluation Report (Woodward-Clyde)
1988	EE/CA followed by Initial Source Control Record of Decision, OU 9
1989	PRPs perform SVE Pilot Study at Colorado Ave. Subsite
1990	EPA Ground Water Report for Hastings Site (PRC)
1990	EPA Source Control Predesign Report (PRC) for Colorado Ave. Subsite
1990	Unilateral Order for OU 9 RD/RA
1991	Feasibility Study, Proposed Plan and ROD completed for OU 1
1993	Unilateral Order for OU 1 RD/RA
1993	EPA agrees to bifurcate SVE project at Dravo's request
1996	Dravo begins operation of SVE, Phase I system
1996	EPA completes Remedial Investigation Report for Hastings Site
1999	Dravo begins operation of Phase II IWA ground water treatment system
2000	Dravo submits draft design for SVE, Phase II
2001	EPA approves revised design for SVE, Phase II
2002	Dravo begins operation of Phase III IWA ground water treatment system

ATTACHMENT 2
REQUIRED ELEMENTS FOR PLANS AND REPORTS TO BE SUBMITTED

CONTENT OF REPORTS/PLANS

The documents listed in this section (Status Reports, Progress Reports, Annual Remedial Action Reports, Sampling and Analysis Plan, Quality Assurance Project Plan, Health and Safety Plan, Contingency Plan, Construction Quality Assurance Plan, Ground Water Monitoring Plan are documents which must be prepared and submitted as outlined in Section XIII of this SOW. One HASP can be submitted and modified, as necessary, for use in all phases of the RD/RA work, as appropriate. The following section describes the required contents of each of the required reports and plans.

A. Status - Notification Reports

- Identify system as to Operable Unit and location
- Date system out of service and reason for shutdown
- Actions taken to remedy situation
- Expected date when system will be restarted

B. Quarterly Progress Reports

Settling Defendants shall submit Quarterly Progress Reports to EPA throughout implementation and operation of the RD, RA. Quarterly Progress Reports shall be submitted in conformity with the schedule shown in Section XIII of the SOW. The submission of Quarterly Progress Reports shall continue until Settling Defendants are notified by EPA that such reports are no longer required. Upon EPA's written determination that Quarterly Progress Reports are no longer required, Settling Defendants shall continue to submit the Annual Remedial Action Reports described in Part C below. Quarterly Progress Reports shall include, but need not be limited to the following:

- Brief summary of project status and previous reporting period activities completed by Settling Defendants
- Description of activities performed during the reporting period

- Summary of sampling results and tests obtained during the reporting period
- Identify deliverables submitted to EPA during the reporting period
- Description of anticipated work to be performed during the next reporting period
- Percent completion, delays (if any) or other treatment system downtime, and efforts to mitigate delays and/or equipment downtime, if applicable
- Modifications to work plans or schedules

C. Annual Remedial Action Reports

- Information identified in Section VII, Task 5 for OU 1
- Information identified in Section VIII, Task 6 for OU 9

D. Post-Treatment Monitoring Reports

- Information identified in Section X, Task 3 for OU 1

E. Quality Assurance Project Plan

Settling Defendants shall develop a Site-specific Quality Assurance Project Plan (QAPP), which shall address sample analysis and data handling for samples collected in all phases of future Site Work, based upon the Consent Decree and guidance identified by EPA. The QAPP shall be prepared utilizing EPA guidance documents listed in Section XIV, Reference Documents, of this SOW and be consistent with the requirements of standard EPA methodology for laboratories. The QAPP shall at a minimum include:

1. Project Description

   - Past Data Collection Activity
   - Project Scope
   - Sample Network Design
   - Parameters to be Tested and Frequency
   - Project Schedule

2. Project Organization and Responsibility

3. Quality Assurance Objective for Measurement Data

   - Level of Quality Control Effort
   - Accuracy, Precision and Sensitivity of Analysis
   - Completeness, Representativeness
   - Comparability

4. Sampling Procedures

5. Sample Custody

   - Field-Specific Custody Procedures
   - Laboratory Chain-of-Custody Procedures

6. Calibration Procedures and Frequency
   - Field Instruments/Equipment
   - Laboratory Instruments

7. Analytical Procedures

   - Analytical Methods
   - Field Screening and Analytical Protocol
   - Laboratory Procedures

8. Internal Quality Control Checks

   - Field Measurements
   - Laboratory Analysis

9. Data Reduction, Validation and Reporting

   - Data Reduction
   - Data Validation
   - Data Reporting

10. Performance and System Audits

    - Internal Audits of Field Activity
    - Internal Laboratory Audit
    - External Field Audit
    - External Laboratory Audit

11. Preventive Maintenance

    - Routine Preventative Maintenance Procedures and Schedules
    - Field Instruments/Equipment
    - Laboratory Instruments

12. Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness

    - Field Measurement Data
    - Laboratory Data

13. Corrective Action

    - Sample Collection/Field Measurement
    - Laboratory Analysis

14. Quality Assurance Reports to Management

F. Sampling and Analysis Plan/Field Sampling Plan

Settling Defendants shall submit the QAPP to EPA for review and approval as described in Section D, above. The Sampling and Analysis Plan (SAP) and the Field Sampling Plan (FSP) shall be submitted as either separate documents or may be combined with the QAPP. In either case, the SAP and FSP shall contain information detailed in Section H, Ground Water Monitoring Plan.

G. Health and Safety Plan

Settling Defendants shall develop a Health and Safety Plan designed to protect on-Site personnel and area residents from physical, chemical and all other hazards posed by implementation of this RD/RA. The safety plan shall develop the performance levels and criteria necessary to address the following areas:

- Personnel
- Levels of protection
- Safe work practices and safety guards
- Medical surveillance
- Personal and environmental air monitoring
- Personal protective equipment
- Personal hygiene
- Decontamination - personal and equipment

- Site work zones
- Contaminant control
- Contingency and emergency planning
- Logs, reports and record keeping

The HASP shall follow U.S. EPA guidance and all OSHA requirements as outlined in 29 C.F.R. 1910 and 1926, as well as the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Section 300.150.

As part of the HASP, Settling Defendants shall include a Contingency Plan describing procedures to be used in the event of an accident or emergency at OU1. The Contingency Plan shall be submitted and shall include, at a minimum, the following:

- Name of the person or entity responsible for responding in the event of an emergency incident

- Plan and date(s) for meeting(s), if necessary, with the local community, including local, State and Federal agencies involved in the cleanup, as well as local emergency squads and hospitals

- First aid medical information

- Air Monitoring Plan (if applicable)

- Spill Prevention, Control, and Countermeasures ("SPCC") Plan (if applicable), as specified in 40 C.F.R. Part 109, describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation

H. Construction Quality Assurance Plan

Settling Defendants shall submit a Construction Quality Assurance Plan ("CQAP") which describes the Site-specific components of the quality assurance program which shall ensure that the completed project meets or exceeds all design criteria, plans and specifications. The CQAP shall be submitted as set forth in Section XIII of this SOW and shall contain, at a minimum, the following elements:

1. Responsibilities and authorities of all organizations and key personnel involved in the design and construction of RA elements, as applicable

2. Qualifications of the Quality Assurance Official to demonstrate he/she possesses the training and experience necessary to fulfill his/her identified responsibilities

3. Protocols for sampling and testing used to monitor construction

4. Identification of proposed quality assurance sampling activities, as appropriate, including the sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports and final documentation. A description of the provisions for final storage of all records consistent with the requirements of the Consent Decree shall be included.

5. Reporting requirements for construction quality assurance activities shall be described in detail in the CQAP. This shall include, as appropriate, such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports and final documentation. Provisions for the final storage of all records shall be presented in the CQAP

I. Ground Water Monitoring Plan

The Settling Defendants shall develop and implement a Ground Water Monitoring Plan ("GWMP") to: 1) monitor the extent and concentration of Contaminants of Concern(CoCs) in ground water within the OU1 Area; 2) establish background ground water monitoring wells upgradient of OU1 to determine background ground water quality with respect to CoCs; and 3) to maintain all ground water monitoring locations during the 10 year period of post remediation ground water monitoring. The existing ground water data and data collected during the performance of the work described in this SOW, as well as well inventory activities shall, in part, form the basis for development of the GWMP.

In addition to data collection activities described above, the information collected under the GWMP shall be suitable to allow the Settling Defendants to monitor the RA progress by: 1) the establishment of background ground water monitoring wells upgradient of the OU1 Area to determine background ground water quality with respect to the CoCs; 2) the quality of ground water exiting the OU 1 Area after passing through the Settling Defendant's IWA treatment well system network; and 3) the identification of need and proposed locations for additional horizontal and vertical ground water data collection points based ground water monitoring results collected during the ten-year monitoring activities.

The GWMP shall be amended during the ten-year monitoring program for OU1, as necessary, and as requested by EPA.

The following shall be addressed in the GWMP:

1. Identification and Selection of Ground Water Monitoring Locations. Based on the survey information collected during the performance of work described in Sections VII and VIII of this SOW and existing subsite data, the GWMP will identify all locations to be included in the ground water monitoring program. Selected locations shall include appropriate existing and newly installed ground water monitoring wells. Criteria for selection of wells shall be based upon location with respect to historical distribution, including the screened interval. The EPA, in consultation with the NDEQ, will approve the final monitoring locations.

2. Chemical Parameters at Each Monitoring Location. The GWMP shall include provisions for the collection and analysis of the volatile organic compounds listed in Attachment 3 to this SOW.

3. Frequency of Ground Water Monitoring. Ground water monitoring data shall be collected on an annual frequency and at locations identified in the GWMP.

4. Ground Water Elevations and Flow. The ground water monitoring program shall include provisions to determine ground water elevation and flow direction.

5. Sampling and Analysis Plan. As part of the GWMP, the Settling Defendants shall prepare a SAP which shall define in detail the sampling and data gathering methods to be used during ground water sampling. Detection limits must meet or be less than the current MCLs for all target analytes. All samples will be analyzed using the appropriate EPA methods and procedures. The EPA may require additional testing based upon the results to verify the Natural Attenuation rate, subject to the Dispute Resolution provisions in the Consent Decree. A FSP or related information shall be included with the SAP.

6. Description of Normal Maintenance of Sampling Locations.

- Description of tasks for maintenance
- Schedule showing frequency of each maintenance task

7. Description of Routine Monitoring and Laboratory Testing.

- Description of monitoring tasks
- Description of required data collection, laboratory tests and interpretation

- Required quality assurance and quality control
- Schedule of monitoring frequency and procedures for a petition to EPA to reduce the frequency of or discontinue monitoring
- Description of verification sampling procedures if Cleanup or Performance Standards are exceeded in routine monitoring

8. Safety Plan.

- Description of precautions, necessary equipment, etc., for Site personnel
- Safety tasks required in event of systems failure

9. Records and Reporting Mechanisms Required

- Sampling and laboratory records
- Mechanism for reporting emergencies
- Personnel and maintenance records
- Reports to state agencies, if applicable

Note: Items 6 - 9 above may be covered in previously approved plans and therefore would not have to be repeated within the GWMP. If Settling Defendants find that existing documents will meet project needs, the existing documents may be included by reference.

ATTACHMENT 3

LIST OF VOLATILE ORGANIC COMPOUNDS

USEPA CONTRACT LABORATORY PROGRAM

STATEMENT OF WORK

FOR

ORGANICS ANALYSIS

Multi-Media, Multi-Concentration

SOM01.0
October 2004

STATEMENT OF WORK

TABLE OF CONTENTS

EXHIBIT C

TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS

NOTE: Specific quantitation limits are highly matrix-dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

The CRQL values listed on the following pages are based on the analysis of samples according to the specifications given in Exhibit D.

For soil samples, the moisture content of the samples must be used to adjust the CRQL values appropriately.

Exhibit C - Target Compound List and Contract Required Quantitation Limits

Table of Contents

1.0 VOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS

			Quantitation Limits				
			Trace Water By SIM	Trace Water	Low Water	Low Soil	Med. Soil
	Volatiles	CAS Number	µg/L	µg/L	µg/L	µg/Kg	µg/Kg
1.	Dichlorodifluoromethane	75-71-8		0.50	5.0	5.0	250
2.	Chloromethane	74-87-3		0.50	5.0	5.0	250
3.	Vinyl chloride	75-01-4		0.50	5.0	5.0	250
4.	Bromomethane	74-83-9		0.50	5.0	5.0	250
5.	Chloroethane	75-00-3		0.50	5.0	5.0	250
6.	Trichlorofluoromethane	75-69-4		0.50	5.0	5.0	250
7.	1,1-Dichloroethene	75-35-4		0.50	5.0	5.0	250
8.	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		0.50	5.0	5.0	250
9.	Acetone	67-64-1		5.0	10	10	500
10.	Carbon Disulfide	75-15-0		0.50	5.0	5.0	250
11.	Methyl acetate	79-20-9		0.50	5.0	5.0	250
12.	Methylene chloride	75-09-2		0.50	5.0	5.0	250
13.	trans-1,2-Dichloroethene	156-60-5		0.50	5.0	5.0	250
14.	Methyl tert-butyl ether	1634-04-4		0.50	5.0	5.0	250
15.	1,1-Dichloroethane	75-34-3		0.50	5.0	5.0	250
16.	cis-1,2-Dichloroethene	156-59-2		0.50	5.0	5.0	250
17.	2-Butanone	78-93-3		5.0	10	10	500
18.	Bromochloromethane	74-97-5		0.50	5.0	5.0	250
19.	Chloroform	67-66-3		0.50	5.0	5.0	250
20.	1,1,1-Trichloroethane	71-55-6		0.50	5.0	5.0	250
21.	Cyclohexane	110-82-7		0.50	5.0	5.0	250
22.	Carbon tetrachloride	56-23-5		0.50	5.0	5.0	250
23.	Benzene	71-43-2		0.50	5.0	5.0	250
24.	1,2-Dichloroethane	107-06-2		0.50	5.0	5.0	250
25.	1,4-Dioxane	123-91-1	2.0	20	100	100	5000
26.	Trichloroethene	79-01-6		0.50	5.0	5.0	250
27.	Methylcyclohexane	108-87-2		0.50	5.0	5.0	250
28.	1,2-Dichloropropane	78-87-5		0.50	5.0	5.0	250
29.	Bromodichloromethane	75-27-4		0.50	5.0	5.0	250
30.	cis-1,3-Dichloropropene	10061-01-5		0.50	5.0	5.0	250
31.	4-Methyl-2-pentanone	108-10-1		5.0	10	10	500
32.	Toluene	108-88-3		0.50	5.0	5.0	250
33.	trans-1,3-Dichloropropene	10061-02-6		0.50	5.0	5.0	250
34.	1,1,2-Trichloroethane	79-00-5		0.50	5.0	5.0	250
35.	Tetrachloroethene	127-18-4		0.50	5.0	5.0	250

Exhibit C -- Section 1
Volatiles Target Compound List and CRQLs (Con't)

1.0 VOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (Con't)

			Quantitation Limits				
			Trace Water By SIM	Trace Water	Low Water	Low Soil	Med. Soil
Volatiles		CAS Number	µg/L	µg/L	µg/L	µg/Kg	µg/Kg
36.	2-Hexanone	591-78-6		5.0	10	10	500
37.	Dibromochloromethane	124-48-1		0.50	5.0	5.0	250
38.	1,2-Dibromoethane	106-93-4	0.050	0.50	5.0	5.0	250
39.	Chlorobenzene	108-90-7		0.50	5.0	5.0	250
40.	Ethylbenzene	100-41-4		0.50	5.0	5.0	250
41.	o-Xylene	95-47-6		0.50	5.0	5.0	250
42.	m, p-Xylene	179601-23-1		0.50	5.0	5.0	250
43.	Styrene	100-42-5		0.50	5.0	5.0	250
44.	Bromoform	75-25-2		0.50	5.0	5.0	250
45.	Isopropylbenzene	98-82-8		0.50	5.0	5.0	250
46.	1,1,2,2-Tetrachloroethane	79-34-5		0.50	5.0	5.0	250
47.	1,3-Dichlorobenzene	541-73-1		0.50	5.0	5.0	250
48.	1,4-Dichlorobenzene	106-46-7		0.50	5.0	5.0	250
49.	1,2-Dichlorobenzene	95-50-1		0.50	5.0	5.0	250
50.	1,2-Dibromo-3-chloropropane	96-12-8	0.050	0.50	5.0	5.0	250
51.	1,2,4-Trichlorobenzene	120-82-1		0.50	5.0	5.0	250
52.	1,2,3-Trichlorobenzene	87-61-6		0.50	5.0	5.0	250

2.0 SEMIVOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS

			Quantitation Limits				
			Low Water By SIM[1]	Water	Low Soil By SIM[1]	Low Soil	Med. Soil
	Semivolatiles	CAS Number	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg
53.	Benzaldehyde	100-52-7		5.0		170	5000
54.	Phenol	108-95-2		5.0		170	5000
55.	Bis-(2-chloroethyl) ether	111-44-4		5.0		170	5000
56.	2-Chlorophenol	95-57-8		5.0		170	5000
57.	2-Methylphenol	95-48-7		5.0		170	5000
58.	2,2'-Oxybis(1-chloropropane)[2]	108-60-1		5.0		170	5000
59.	Acetophenone	98-86-2		5.0		170	5000
60.	4-Methylphenol	106-44-5		5.0		170	5000
61.	N-Nitroso-di-n propylamine	621-64-7		5.0		170	5000
62.	Hexachloroethane	67-72-1		5.0		170	5000
63.	Nitrobenzene	98-95-3		5.0		170	5000
64.	Isophorone	78-59-1		5.0		170	5000
65.	2-Nitrophenol	88-75-5		5.0		170	5000
66.	2,4-Dimethylphenol	105-67-9		5.0		170	5000
67.	Bis(2-chloroethoxy) methane	111-91-1		5.0		170	5000
68.	2,4-Dichlorophenol	120-83-2		5.0		170	5000
69.	Naphthalene	91-20-3	0.10	5.0	3.3	170	5000
70.	4-Chloroaniline	106-47-8		5.0		170	5000
71.	Hexachlorobutadiene	87-68-3		5.0		170	5000
72.	Caprolactam	105-60-2		5.0		170	5000
73.	4-Chloro-3-methylphenol	59-50-7		5.0		170	5000
74.	2-Methylnaphthalene	91-57-6	0.10	5.0	3.3	170	5000
75.	Hexachlorocyclo-pentadiene	77-47-4		5.0		170	5000
76.	2,4,6-Trichlorophenol	88-06-2		5.0		170	5000
77.	2,4,5-Trichlorophenol	95-95-4		5.0		170	5000
78.	1,1'-Biphenyl	92-52-4		5.0		170	5000

[1]CRQLs for optional analysis of water and soil samples using SIM technique for PAHs and phenols.

[2]Previously known as bis(2-Chloroisopropyl)ether.

ATTACHMENT 4
REFERENCE DOCUMENTS

The National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300

"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9355.3-01, EPA/540/G-89/004, October 1988.

"EPA Superfund Remedial Design and Remedial Action Guidance," US EPA, Office of Solid Waste and Emergency Response, OSWER Directive 9355.0-4B.

"EPA Oversight of Remedial Designs and Remedial Actions Performed by PRP," Office of Emergency and Remedial Response, OSWER Directive No. 9355.5-01, February 1990.

"EPA Oversight of Remedial Designs and Remedial Actions Performed by PRP," Office of Emergency and Remedial Response, OSWER Directive No. 9355.5-01FS, February 1990.

"Guidance for Scoping the Remedial Design", US EPA, Office of Solid Waste and Emergency Response, EPA Publication No. 9355.0-43, EPA/540/R-95/025, Publication No. 95-963308

"The Remedial Action Report - Documentation for Operable Unit Completion," US EPA, Office of Solid Waste and Emergency Response, EPA Publication No. 9355.0-39FS, June 1992. Publication No. 963364

"Comprehensive Five- Year Review Guidance," US EPA, Office of Solid Waste and Emergency Response, OSWER Directive 9355.7-03 B-P. EPA 5A0-R-01-007

"Quality in the Constructed Project: A Guideline for Owners, Designers and Constructors," American Society of Civil Engineers, 2nd Edition,2000.

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"Sampler's Guide to the Contract Laboratory Program," US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9240.0-30, EPA/540/R-96/02.

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"CERCLA Compliance with Other Laws Manual, Part II," Interim Final, US EPA, Office of Emergency and

Remedial Response, OSWER Directive No. 9234.1-02, EPA/540/G-89/009, August 1989.

"Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," Interim Final, US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9283.1-2, EPA/540/G-88/003, December 1988.

"Overview of the Off-Site Rule for OSCs and RPMs," US EPA, Office of Solid Waste and Emergency Response, EPA Publication No. 9834.11FS, September 1993.

"Risk Assessment Guidance for Superfund: Volume 1 -- Human Health Evaluation Manual (Part A)," Interim Final, US EPA, Office of Emergency and Remedial Response, EPA/540/1-89/002, December 1989.

"Risk Assessment Guidance for Superfund: Volume 1 -- Human Health Evaluation Manual (Part A)," Fact Sheet, US EPA, Office of Emergency and Remedial Response, EPA Publication No. 9285.7-01/FS, April 1990.

"Risk Assessment Guidance for Superfund: Volume 1 -- Human Health Evaluation Manual (Part B), Development of Risk-Based Preliminary Remediation Goals," Interim Final, US EPA, Office of Emergency and Remedial Response, EPA Publication No. 9285.7-01B, December 1991.

"Risk Assessment Guidance for Superfund: Volume 1 -- Human Health Evaluation Manual (Part C), Risk Evaluation of Remedial Alternatives," Interim Final, US EPA, Office of Emergency and Remedial Response, EPA Publication No. 9285.7-01C, December 1991.

"Health and Safety Audit Guidelines, SARA Title 1, Section 126," US EPA, Office of Emergency and Remedial Response, EPA/540/G-89/010, December 1989.

"Health and Safety Roles and Responsibilities at Remedial Sites," US EPA, Office of Solid Waste and Emergency Response, EPA Publication No. 9285.1-02, July 1991.

"Community Relations In Superfund: A Handbook," US EPA, Office of Emergency and Remedial Response, EPA/540/R-92/009, January 1992

"Health and Safety Requirements of Employees Employed in Field Activities," US EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December 19, 1986).

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"Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities," Interim Final Guidance, (OSW: 530-SW-89-026) also, Addendum to Interim Final Guidance, OSW, June 1992.

"Toxicity Characteristic," Final Rule, (EPA/OSW-FR-89-026).

"Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water," EPA/600/R-98/128, September 1998. Publication 99-130023

"Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," OSWER, 9200.4-17P, April 21, 1999.

ANSI/ASQC E-4-1994, “Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs,” (American National Standard, Jan. 5, 1995)

"EPA Requirements for Quality Management Plans," EPA, QA/R-2, March 2001 *

“Guidance for the Data Quality Objectives Process,” EPA, QA/G-4, August 2000*

“Data Quality Objectives Process for Hazardous Waste Site Investigation,” EPA, QA/G-4HW, Jan. 2000 *

"EPA Requirements for Quality Assurance Project Plans," EPA, QA/R-5, March 2001 *

"EPA Guidance for Quality Assurance Project Plans," EPA, QA/G-5,December 2002 *

“Guidance for Preparing Standard Operating Procedures,” EPA, QA/G-6, March 2001 *

“Guidance on Environmental Data Verification and Data Validation,” EPA, QA/G-8, Nov. 2002 *

“Guidance for Data Quality Assessment: Practical Methods for Data Analysis,” EPA QA/G-9, July 2000 *

* electronic versions available on-line at www.epa.gov/quality/qa_docs.html

LIST OF MONITORING WELLS

Part A. List of Monitoring Wells and Depths to be monitored for the Phase II, Pine Avenue System.

Well	Screen Depth	Sample Depth
MW-2	116 – 136	133 ft
MP-13	120 – 130	125 ft
MP-14	120 – 130	125 ft
IAS-2	147.5 - 150	148 ft.
IAS-4	147.5 - 150	148 ft.
MW-10	120 – 135	135 ft.
MW-4	120 – 135	135 ft.
BW-12	180 - 190	185 ft.
MW-22	120 - 210	2 samples; 125 ft., and 155 ft.
OW-4S	120 – 140	130 ft.
OW-4D	170 - 180	175 ft.

Part B. List of Monitoring Wells and Depths to be monitored for the Phase II, Cedar Avenue System.

Well	Screen Depth	Sample Depth
OW-4S	120 – 140	130 ft.
OW-4D	170 - 180	175 ft.
BW-14	145 - 155	150 ft.
BW-13	145 - 155	150 ft.
MW-13	142 - 182	155 ft.
MLW-1	132 – 142, 148 – 158, 165 – 180, 186 – 196, 205 - 220	2 samples, 155 ft. and 190 ft.
MLW-2	140 – 150, 155 – 165, 170 – 180, 183 – 198, 205 - 220	2 samples, 148 ft. and 160 ft.
G-7D	147 – 157	150 ft.

LIST OF MONITORING WELLS
(cont.)

Part C. List of Monitoring Wells and Depths to be monitored for the Phase III, 6th Avenue and South Street Systems.

Well	Screen Depth	Sample Depth
MLW-1	132 – 142, 148 – 158, 165 – 180, 186 – 196, 205 - 220	2 samples, 155 ft. and 190 ft.
MLW-2	140 – 150, 155 – 165, 170 – 180, 183 – 198, 205 - 220	2 samples, 148 ft. and at 160 ft.
G-7D *	147 – 157	150 ft.
MW-19	120 – 140	135 ft.
BW-20	120 – 130	123 ft.
MW-5	116.6 – 136.3	135 ft.
BW-21	160 – 175	168 ft.
BW-22	145 – 155	150 ft.
BW-23	170 – 180	175 ft.
BW-24	145 – 155	150 ft.
MW-6 *	116.8 – 136.4	130 ft.
MW-17	140 – 180	160 ft.
GM-1S *	120 – 140	130 ft.
GM-1D *	150 – 170	160 ft.

* For any Spring or Fall sampling event performed by the City, Dravo will not be required to duplicate sampling for these wells. Dravo shall incorporate the City's data for these wells into its Annual Reports.

LIST OF MONITORING WELLS
(cont.)

Part D. List of Monitoring Wells and Depths to be monitored for Post Treatment Monitoring.

Well	Screen Depth	Sample Depth
MW-2	116 – 136	133 ft.
IAS-2	147.5 – 150	148 ft.
IAS-4	147.5 – 150	148 ft.
MW-22	120 – 210	125 ft.
	120 – 210	150 ft.
OW-4S	120 – 140	130 ft.
OW-4D	170 – 180	175 ft.
BW-14	145 – 155	150 ft.
BW-13	145 – 155	150 ft.
MLW-1	148 – 158	155 ft.
	186 – 196	190 ft.
MLW-2	140 – 150	148 ft.
	155 – 165	160 ft.
G-7D	147 – 157	150 ft.
BW-21	160 – 175	168 ft.
BW-22	145 – 155	150 ft.
BW-23	170 – 180	175 ft.
BW-24	145 – 155	150 ft.
MW - 17	140 – 180	160 ft.
GM – 1D	150 – 170	160 ft.
MW - 24	120 – 220	2 samples, 135 ft. and 160 ft.

CALCULATION OF CONTAMINANT REMOVAL

A. Contaminant Mass Removal Calculations Based on Vapor Concentrations

The vapor VOC concentrations obtained from the influent air traveling from IWA wells into the IWA treatment systems are used to calculate estimated VOC mass removal totals for an operating period. To calculate the estimated VOC mass removal of the IWA systems during the operating period, the following methods and assumptions are used:

1) The combined airflow through the treatment system is used if more than one IWA well is treated by the same system.
2) Manufacturer's estimates of the rate of airflow through the system can be used.
3) Hours of operation during any operational period for each system are obtained from the daily log sheets.
4) Using the airflow rate estimates and the hours of operation, the volume of treated air can be obtained by multiplying the airflow rate and time of operation together, using appropriate conversions.
5) Actual vapor analytical results of contaminants of concern are used from the operating period. These are obtained from the influent air line using a summa canister, and sent to an air lab for analysis. If more than one analytical result is available, due to duplicate sampling or repeated sampling, a weighted average can be used, or if appropriate, a smaller operational time period can be used. The effluent air line is also sampled, and if concentrations are present in the effluent, only the concentration difference is used in the calculations.
6) By multiplying the analytical result of any contaminant of concern (influent concentration or influent minus effluent concentration, units are volume of contaminant per volume of air in parts per billion by volume) by the volume of air treated, the volume removed of that compound can be calculated. Appropriate conversion factors for converting volume of contaminant to mass of contaminant will then be necessary for obtaining contaminant mass removal by the IWA treatment system.

B. Contaminant Mass Removal Calculations Based on Groundwater Concentrations

Groundwater concentrations are also used to calculate the estimated total contaminant mass removed and to provide a basis for evaluating the effectiveness of each IWA treatment system. The volume of water treated can be represented as a prism or other three dimensional space having a cross section assumed to be equivalent to the cross section of the treatment zone and a length consistent with the 1-year travel distance for ground water moving through the area of treatment. The estimate for contaminant mass is calculated by: 1) multiplying a mean upgradient ground water concentration value representing the previous reporting period (for each contaminant of concern) by the volume of ground water passing through the treatment zone(s) in one year; and,
2) subtracting the contaminant mass calculated using data from ground water samples taken for the current reporting period downgradient from the area of treatment.